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A LARGE-SCALE MULTI ETHNIC STUDY OF A DIRECT MEASURE OF INSULIN SENSITIVITY DEMONSTRATES THAT SOUTH ASIANS ARE THE MOST INSULIN RESISTANT ETHNIC GROUP IN THE US

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Background: Insulin resistance (IR) is a known risk factor for heart disease. Few studies have compared race/ethnic differences in IR using 'gold standard' direct measures of insulin sensitivity

Methods: A total of 892 non-diabetic subjects (548 White,106 South Asian, 103 East Asian, 86 Hispanic and 49 Black) underwent a 4-hour insulin suppression test (IST) as a part of IR related studies at Stanford over the last ~20 years. We used generalized estimating equations assuming an exchangeable correlation structure to determine the association between race/ethnicity and steady state plasma glucose (SSPG) derived from an IST, accounting for correlation of outcomes among subjects from the same study. We similarly determined whether differences in plasma triglyceride (TG) and high-density lipoprotein (HDL) levels among race/ethnic groups could be explained by differences in SSPG. All analyses were adjusted for age, sex, and BMI.

Results: Significant differences among the race/ethnic groups in SSPG were observed ($p < 0.001$). South Asians were the most insulin resistant group with a mean increase in SSPG of 38 mg/dL, compared to whites after controlling for age, sex, and BMI, a difference equivalent to ~1/2 of the standard deviation of SSPG. East Asians were the next most resistant group (mean +33 mg/dl SSPG compared to whites) followed by Hispanics (+20 mg/dl), Whites, and Blacks (-7 mg/dl). South Asians were the only group with significantly higher TG (mean +1.16 fold, $p=0.04$) and lower HDL (-3.0 mg/dl, $p=0.02$) levels compared to whites but these differences were no longer evident after controlling for SSPG. In contrast, Blacks had significantly lower TG (mean 0.8 fold, $p = 0.006$) compared to whites, but this difference was not at all mitigated after adjusting for SSPG.

Conclusions: Direct measures of insulin sensitivity suggest that South Asians are the most insulin resistant race/ethnic group in the US even after adjusting for the principal determinants of IR. IR may be largely responsible for differences in TG and HDL observed between South Asian and other race/ethnic groups. The etiologies behind differences in insulin sensitivity across race/ethnic groups remain to be determined.